

EXAM II

NAME _____
last first

Significant Figures must be correct. All set-ups must be shown

(12 points) **1.** The volume of an Al atom is 8.18×10^{-24} cm. It crystallizes into the face centered cubic system. What is the length of an edge of the aluminum unit cell in pico meters.? You must show complete setup.

ANSWER_____

(5 points) **2.** Give the type of crystalline solid and tell what type of particles are located at the lattice points for each of the following:

Example	Type of crystal	Type of particle at the lattice point
	Network Covalent	
SO ₂		
Na		
Fe ₂ (SO ₄) ₃		
C ₂₂ H ₄₆		

(6 points) 3. What is the major type of intermolecular forces for the following:

- a. CO _____
- b. CF₄ Tetrahedral _____
- c. CH₃CH₂CH₂CH₂CH₂CH₃ _____

(4 points) 4. a. Which would have a bigger atom Na or Ga _____

b. Which would have a bigger atom Be or Mg _____

c. Which would have a bigger ionization energy Rb or K? _____

d. Which would have a bigger electron affinity O or S? _____

(9 points) 5. Draw the lewis dot structures for the following:

a. CO₂

b. HNO₃

c. BI₃

6. (5 pts) a. Arrange in order of increasing size: N³⁻, N, F⁻, P, S, Mg

b. Which in part a are isoelectronic?

7. (13 pts) Gold crystallizes in the body-centered cubic structure. The radius of the gold atom is 144 pm. Calculate the density of gold.

Answer _____

/18 points

(12 pts) 8. Draw and label the Born-Haber cycle for the formation of cesium oxide.

c) From the following data, calculate the lattice energy of cesium oxide.

- Enthalpy of formation of cesium oxide: -218 kJ/mol
- Enthalpy of bond dissociation of oxygen: +619 kJ/mol
- Enthalpy of sublimation of cesium: + 64 kJ/mol
- First ionization energy of cesium: +526 kJ/mol
- First electron affinity of oxygen: -132 kJ/mol
- Second electron affinity of oxygen: +961 kJ/mol

Answer_____

/12 points